

Materials Research Science and Engineering Centers (MRSEC)

Program Solicitation

NSF 04-580

Replaces Document NSF 01-109



National Science Foundation

Directorate for Mathematical and Physical Sciences

Division of Materials Research

Preliminary Proposal Due Date(s) (required):

September 08, 2004

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

January 24, 2005

(by invitation only)

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Materials Research Science and Engineering Centers (MRSEC)

Synopsis of Program:

Supports interdisciplinary materials research and education while addressing fundamental problems in science and engineering. MRSECs require outstanding research quality and intellectual breadth, provide support for research infrastructure and flexibility in responding to new opportunities, and strongly emphasize the integration of research and education. These centers foster active collaboration between universities and other sectors, including industry, and they constitute a national network of university-based centers in materials research. MRSECs address problems of a scope or complexity requiring the advantages of scale and interdisciplinary interaction provided by a campus-based research center.

Cognizant Program Officer(s):

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Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.049 --- Mathematical and Physical Sciences

Eligibility Information

- **Organization Limit:** Proposals may be submitted by universities in the US with broad programs in materials research and education in support of center-type activities. Existing MRSECs that are re-competing are required to submit preliminary proposals.
- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** 1. Only two pre liminary proposals may be submitted by any one organization as the lead organization. An individual may be the Principal Investigator for only one preliminary proposal. Full proposals may be submitted by invitation only.

Award Information

- **Anticipated Type of Award:** Cooperative Agreement
- **Estimated Number of Awards:** 12 to 15
- **Anticipated Funding Amount:** \$26,000,000 for FY 2005, pending the availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is required (Percentage).
- **Cost Sharing Level/Amount:** 10%
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Preliminary Proposals (required) :**
September 08, 2004
- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
January 24, 2005
(by invitation only)

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria. Additional merit review considerations apply.

Please see the full text of this solicitation for further information.

Award Administration Information

- **Award Conditions:** Additional award conditions apply. Please see the full text of this solicitation for further information.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

Materials Research Science and Engineering Centers (MRSECs) support interdisciplinary and multidisciplinary materials research and education of the highest quality while addressing fundamental problems in science and engineering. MRSECs require outstanding research quality, intellectual breadth, interdisciplinarity, flexibility in responding to new research opportunities, support for research infrastructure, and they foster the integration of research and education in the materials field. They are expected to have strong links to industry and other sectors, as appropriate, and to contribute to the development of a national network of university-based centers in materials research. MRSECs address fundamental materials research topics of intellectual and technological importance, contribute to national priorities by promoting active collaboration between academia and other sectors, and enable researchers to address problems of a scope and complexity requiring the advantages of scale and interdisciplinarity provided by a campus-based research center.

The NSF's mission is to promote and facilitate the progress of science, engineering, and related education in the United States. Its role in supporting research and education is particularly important in creating physical and human resources infrastructure in both traditional and emerging areas. NSF also promotes partnerships, including collaboration with other academic organizations, agencies, industry, national and government laboratories, for projects of mutual interest. International collaborations are also strongly encouraged.

The MRSEC program reinforces NSF's commitment to excellence in interdisciplinary research and education; it is national in scope and significance, requiring coordination of the overall effort among Centers. The MRSEC program complements, but does not substitute for, NSF support for individual investigators, small groups, national user facilities, and instrumentation in materials research.

II. PROGRAM DESCRIPTION

MRSECs are supported by NSF to undertake materials research of a scope and complexity that would not be feasible under traditional funding of individual research projects. NSF support is intended to reinforce the base of individual investigator and small group research by providing the flexibility to address topics requiring an approach of broad scope and duration. MRSECs are university-based, and undertake an interactive, interdisciplinary approach to materials research and education while fostering active cooperation among university-based researchers and those concerned with the application of materials research in industry and elsewhere. A MRSEC may encompass one or more interdisciplinary research groups (IRGs). Each IRG involves several faculty members and associated researchers, addressing a major topic or area, which may range from fundamental to applied research, in which sustained support for interactive effort by several participants with complementary backgrounds, skills, and knowledge is critical to progress. The IRGs in a Center may be topically related, or they may address different topical aspects of materials research; they contribute to the synergy arising from the research and education activities of the Center and its common infrastructure, shared facilities and outreach programs. Thus, the Center as a whole is expected to be more than the sum of its parts.

The scope of activities of each MRSEC depends on the capabilities of the proposing organization. Smaller Centers normally consist of a single IRG addressing a particular topic in materials research. Larger Centers undertake a broader program of research and education, and may involve several IRGs. MRSECs incorporate most or all of the following activities to an extent consistent with the size and vision of the Center:

- Programs to stimulate interdisciplinary education and the development of human resources (including support for underrepresented groups) through cooperation and collaboration with other organizations and sectors, as well as within the host organization. Cooperative programs with organizations serving predominantly underrepresented groups in science and engineering are strongly encouraged.
- Active cooperation with industry to stimulate and facilitate knowledge transfer among the participants and strengthen the links between university-based research and its application.
- Cooperation and collaboration with other academic organizations and national laboratories.
- Active efforts to establish research collaborations and education activities at the international level are strongly encouraged. Cooperative activities may include, but are not limited to: joint research programs; affiliate programs; joint development and use of shared experimental facilities; access to user facilities; visiting scientist programs; joint educational ventures; joint seminar series, colloquia or workshops.

- Support for shared experimental facilities, properly staffed, equipped and maintained, and accessible to users from the Center, the participating organizations, and other organizations and sectors.

Each MRSEC has the responsibility to manage and evaluate its own operation with respect to program administration, planning, content and direction. NSF support is intended to promote optimal use of university resources and capabilities, and to provide maximum flexibility in setting research directions, developing cooperative activities with other organizations and sectors, and responding quickly and effectively to new opportunities in materials research and education that are important to the nation's research and technology base. NSF encourages MRSECs to include support for junior faculty, high-risk projects, and emerging areas of interdisciplinary materials research.

The MRSECs constitute a spectrum of coordinated Centers of differing scientific breadth and administrative complexity, which may address any area of materials research. The MRSEC program enables specialized areas of interdisciplinary excellence to be integrated into a national network of Centers. These in turn provide, in addition to research excellence, the infrastructure of equipment, education and outreach needed to ensure that the program as a whole meets its objectives and provides for effective coordination within and beyond the MRSEC community. MRSEC Directors are expected to contribute to the network addressing common problems and applications.

III. ELIGIBILITY INFORMATION

Universities in the US with broad research and education programs in the area of condensed matter physics, solid state and materials chemistry, materials science and engineering, and related areas of science and engineering may submit **preliminary proposals**.

In order to reduce the burden of proposal writing for the materials research community and the burden of subsequent proposal review and evaluation for reviewers and NSF staff, NSF will accept **full proposals** for MRSECs **by invitation only**, based on the results of the preliminary proposal evaluation.

While more than one organization may participate in a single proposal or preliminary proposal, one organization must accept overall management responsibility for the Center. A single organization may not be the lead organization in more than two preliminary proposals. An individual may be the Principal Investigator for only one preliminary proposal. The MRSEC program will not normally provide support simultaneously for more than one Center based at any one organization.

IV. AWARD INFORMATION

Individual MRSEC awards are expected to range in size from about \$1.0 million/year to a maximum of \$5.0 million/year. The average award of currently funded MRSECs is about \$1.9 million/year.

Awards will be made for an initial duration of up to six years, but the level of funding for the last two years of it will be contingent upon the outcome of a thorough external review. The number of awards will depend on the availability of funds and the quality of proposals received. Any funding provided to existing Centers after the initial duration will be based on the submission of a re-competing proposal as described below.

Proposals from existing (re-competing) Centers will be evaluated in open competition with new proposals at the preliminary proposal stage. If a proposal from an existing Center is not successful, phase-out support may be provided at a reduced level for up to two additional years under the current award. If a proposal from an existing Center is successful, a new cooperative agreement will be awarded for the new Center.

Awards are based on comprehensive, competitive merit review. Re-competing Centers must demonstrate excellence, significant achievements, and organizational and national impact in materials research; substantive accomplishments in the integration of research and education; active and effective collaboration with industry and other sectors, as appropriate; and effective development and operation of shared facilities. Achievements under prior NSF support are a critical factor when re-competing proposals are considered. The commitment of each Center to introducing substantially new research topics and undertaking innovative research will also be important in considering re-competing proposals.

Anticipated effective date of new awards: September 2005.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals (required):

Preliminary proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: <http://www.nsf.gov/cgi-bin/getpub?gpg>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

Preliminary proposals that exceed the page limitations will be ineligible for consideration and will be returned without review.

1. ***NSF Cover Sheet***

Proposers are reminded to identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet, and to select "Materials Rsch Sci and Eng Cent" from the FastLane organization unit pull-down list. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

2. ***Project Summary***: include a brief overview of the Center as a whole, a concise rationale for establishing the Center, outline of the existing and planned capabilities of the participating organizations in materials research and education, and highlight the main activities, administration, infrastructure and partnerships of the Center. It **must** indicate, in separate paragraphs, the intellectual merit of the proposed work and its broader impacts. **Limit: 2 pages.**

3. ***Table of Contents***. Will be generated automatically by FastLane

4. ***Project Description***:

The entire Project Description section is limited to no more than twenty five pages total, including tables and illustrations, regardless of the number of IRGs. Limits are set on each Section as indicated.

Include the following:

- a). *A list of participating senior investigators* (faculty level and equivalent) by name, organizational and departmental affiliation. **Limit: 1 page.**

- b). *A description of pertinent achievements under prior NSF support*, where applicable. **Limit: 2 pages.**

- c). *A description of each proposed area of multi-investigator, interdisciplinary group research*, including names of faculty-level participants and numbers of students and postdoctoral associates in each group (**limit this section to no more than three pages for each IRG**).

- d). *A description of seed funding and emerging areas*. Through this mechanism, NSF intends to provide flexibility for the Center to respond quickly and effectively to new opportunities. Briefly describe other proposed research plans and related activities, showing clearly how they are related to the mission of the Center. These may include (but are not limited to): seed support for junior faculty and for investigators changing fields; high-risk research projects; emerging areas of interdisciplinary research; experimental programs to link the university effort in materials with industry and other sectors; the development of tools for remote access to instrumentation; and innovative interdisciplinary educational ventures. **Seed funding through the Center is not intended to provide a substitute for NSF individual investigator funding: the criteria and mechanisms for selecting and evaluating projects must be clearly addressed in the management plan.** Include the names of key personnel for the first year. **Limit: 2 pages.**

- e). Other significant activities include:
 - e.1) *Education and human resource development*. Describe the education and human resource goals, provide a rationale for those goals, and indicate desired outcomes for the 6 year period. Briefly describe how the education goals integrate strategically with the research and organizational/partnership opportunities of the Center. Outline plans for increasing the participation of women and underrepresented minorities in Center research and education activities. **Limit: 2 pages.**

 - e.2). *Collaborations with industry and/or other sectors*; Describe plans for significant intellectual and resource exchange, cooperation, and partnership with other organizations that may involve academic organizations, national laboratories, industry, federal, state, and local governments and others. **Limit: 1 page.**

 - e.3). *Shared Experimental Facilities*. Describe the shared experimental facilities existing and to be established, including specific major instrumentation, and plans for the development of instrumentation. Describe plans for maintaining and operating the facilities, including staffing, provision for user fees, and plans for ensuring access to outside users. Distinguish clearly between existing facilities and those still to be developed. **Limit: 1 page.**

 - e.4). *International Collaboration* (complete this section if appropriate). Describe the nature of the collaboration and the expected international and scientific or engineering benefits to the research and education program. Include a description of the research facilities at the foreign site, as

appropriate, and of the division of effort and expertise among the collaborators. **Limit: 1 page.**

- e.5). *Leadership, administration and management* of the Center. Describe the Center management team and provide outline of the proposed arrangements for the integrated Center management structure. **Limit: 1 page.**

- f). *A synopsis of organizational and other commitments* to the proposed Center. **Limit: 1 page.**

- g). *A Summary Table of Requested NSF Support* (see Full Proposal section below).

5. **References Cited** in the Project Description should be listed here.

6. **Biographical Sketch** of Principal Investigator Center Director (PI) and key participants: co-PIs and IRG leaders. **Limit: 1 page each.**

7. **Budget pages and budget justification.** Complete budget pages for each year of support (1-6). Also provide a six-year summary budget justification that may not exceed a total of 3 pages. A six-year budget summary will be automatically generated. Provide separate budget pages for the Center as a whole and for each sub award organization.

No additional material is required or accepted with the preliminary proposal submission.

Concurrently with submission of the preliminary proposal, please submit via FastLane and send an e-mail to mrsec@nsf.gov the following:

1. The title of the preliminary proposal, the submitting organization(s), and the name of the PI(s);
2. a list of individuals (and their affiliations) outside the participating organizations whose participation in the review of the preliminary proposal might constitute a conflict of interest through association with the participants;
3. a list of individuals who might be suitable to act as impartial reviewers. Please include their contact information, phone number, e-mail, affiliation, and area of expertise.

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance

with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: <http://www.nsf.gov/cgi-bin/getpub?gpg>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

A full proposal may be submitted only by invitation. **Proposals that exceed the page limitations or that contain items other than those described below will be ineligible for consideration and will be returned without review.**

1. **NSF Cover Sheet.**

2. **Project Summary.** Provide a clear vision for and description of the proposed MRSEC and its potential impact. Briefly describe the organizational setting of the Center, its proposed scope and organization, activities in research and education and their integration, development of human resources, shared experimental facilities, collaborative activities with industry, national laboratories, and other sectors, links with related major research centers on or off campus, and management plan. Indicate in a separate paragraph, the intellectual merit and broader impacts of the proposed work. **Limit: 3 pages.**

3. **Table of Contents.** Generated automatically by FastLane.

4. **Project Description.** Include the following:

- a). *List of Participants.* List each senior investigator (faculty level or equivalent), by full name, and his/her organizational and departmental affiliation; also enter each name in "Add/Delete Non Co-PI Senior Personnel" FastLane form.
- b). *Achievements Under Prior NSF Support.* Currently NSF funded MRSECs must describe achievements under prior NSF support that pertain to the present proposal. Re-competing proposals should also list publications and patents from prior NSF support under section (I) below. Other proposals may use this section to describe their scientific achievements under prior NSF support. Collaborative research and related activities funded by other agencies also may be included here. **Limit: 5 pages.**
- c). *Interdisciplinary Research Groups (IRGs).* The Center may encompass one or more IRGs. For each IRG proposed, provide a concise description of the long-term research goals and intellectual focus, and describe the planned research activities in sufficient detail to enable their scientific merit and significance to be assessed. Describe the role and intellectual contribution of each senior participant in the IRG, and briefly outline the resources available or planned to accomplish the research goals (it will be helpful to underline the name of each senior investigator wherever it occurs). **The need for an interactive, interdisciplinary approach involving several investigators, and the means of achieving this, should be clearly established.** Place the IRG in the context of the Center as a whole, and describe interactions with other groups and organizations. At the beginning of each IRG section in the proposal, name the senior personnel

who will participate, and state the proposed number of postdoctoral and graduate student participants. **Limit for each IRG: 10 pages, including tables and figures.**

- d). *Seed Funding and Emerging Areas*. Through this mechanism, NSF intends to provide flexibility for the Center to respond quickly and effectively to new opportunities. Briefly describe other proposed research plans and related activities, showing clearly how they are related to the mission of the Center. These may include (but are not limited to): seed support for junior faculty and for investigators changing fields; high-risk research projects; emerging areas of interdisciplinary research; experimental programs to link the university effort in materials with industry and other sectors; the development of tools for remote access to instrumentation; and innovative interdisciplinary educational ventures. **Seed funding through the Center is not intended to provide a substitute for NSF individual investigator funding: the criteria and mechanisms for selecting and evaluating projects must be clearly addressed in the management plan.** Include the names of key personnel for the first year. **Limit: 3 pages.**

- e). Other significant activities include:
 - e.1). *Education, Human Resources Development*. Describe the education and human resource goals, provide a rationale for those goals, and indicate desired outcomes for the 6 year period. Briefly describe how the education goals integrate strategically with the research and organizational/partnership opportunities of the Center. Outline plans for increasing the participation of women and underrepresented minorities in Center research and education activities. Outline plans for seminar series, colloquial workshops, conferences, summer school and related activities, as appropriate. Describe any additional education programs not included in other sections of the proposal. **Limit: 3 pages.**

 - e.2). *Collaboration with Industry and Other Sectors*. Describe plans for significant intellectual and resource exchange, cooperation, and partnership with other organizations that may involve academic organizations, national laboratories, industry, federal, state, and local governments and others. Define the goals of the collaboration, describe the planned activities, and expected outcomes. Describe the roles of the senior participants, the mechanisms planned to stimulate and facilitate knowledge transfer, and the potential long-term impact of the collaborations. **Limit: 3 pages.**

 - e.3). *Shared Experimental Facilities*. Describe the shared experimental facilities existing and to be established, including specific major instrumentation, and plans for the development of instrumentation. Describe plans for maintaining and operating the facilities, including staffing, provision for user fees, and plans for ensuring access to outside users. Distinguish clearly between existing facilities and those still to be developed. **Limit: 3 pages.**

 - e.4). *International Collaboration* (complete this section if appropriate). Describe the nature of the collaboration and the expected international and scientific or engineering benefits to the research and education program. Include a description of the research facilities at the foreign site, as

appropriate, and of the division of effort and expertise among the collaborators. **Limit: 1 page.**

- e.5). *Management.* Describe the plans for administration of the Center, including the functions of key personnel and the role of any advisory committee, executive committee, and/or program committee or their equivalent. Describe the procedures and criteria used to select, administer, and evaluate the Interdisciplinary Research Groups and other research programs of the Center, including seed funding and collaborative programs with other groups and organizations. Plans for administering the shared experimental facilities should be described under item (e.3). Describe plans for administering the educational programs and outreach activities of the Center, as appropriate. **Limit: 3 pages.**

- f). *Organizational Commitments and Other Sector Support.* Outline organizational and other commitments to the Center, including matching funds, space, faculty and staff positions, capital equipment, access to existing facilities, commitments for collaboration and outreach programs, and other commitments. Note: letters of support may be included in the Supplementary Documents section of FastLane (Limit 5 pages). **Limit: 1 page.**

- g). *Studies of Societal Implications* (complete this section if appropriate). Describe the research addressing the potential economic, legal, ethical and other societal implications of newly developed technology and emerging science fields. **Limit: 3 pages.**

- h). *Publications and Patents under Prior NSF Support.* For re-competing proposals only, list publications and patents under prior NSF MRSEC support.

- i). *Summary Table of Requested NSF Support* (for both preliminary proposal and full proposal). In tabular form as follows, summarize the overall support levels planned for each of the major activities of the MRSEC as a whole.

SUMMARY TABLE OF REQUESTED NSF SUPPORT		
ACTIVITY	YEAR 1	6-YEAR TOTAL*
IRG 1 (Title)		
IRG 2 (Title) (repeat for each IRG)		
Seed Funding and Emerging Areas		
Shared Experimental Facilities		
Education and Human Resources		
Collaboration with Industry and Other Organizations		
Administration		
Total		

* Funding in years 5 and 6 will be contingent upon the outcome of an external review during the fourth year of the award.

For each entry in the Table include indirect costs. Column totals must equal the total budget requested from NSF for the period shown. Include major capital equipment under shared experimental facilities. Support for graduate students should normally be included under research, not under education and human resources.

5. **References Cited** in the Project Description should be listed here.
6. **Biographical Sketches.** Include a biographical sketch for each faculty level participant according to GPG guidelines. Include contact information, PhD and Postdoc advisors. **Limit: 1 page for each senior investigator.**

7. **Budget pages and budget justification**

Complete budget pages for each year of support (1-6). Also provide a six-year summary budget justification that may not exceed a total of 3 pages. A six-year budget summary will be automatically generated. Provide separate budget pages for the Center as a whole and for each sub award organization.

8. **Current and Pending Support.** List current and pending support for each faculty level investigator.
9. **Letters of Support.** Include only official letters of support verifying specific commitments of resources from participating organizations. Scan your signed letters into the Supplementary Documents section of FastLane, but do not send originals. **Limit: 5 pages.**

Additional Information :

Reviewer Information: Enter the following information into the FastLane "List of Suggested Reviewers" section:

1. a list of individuals (and their affiliations) outside the participating organizations whose participation in the review of the full proposal might constitute a conflict of interest through association with the participants; and
2. a list of individuals who might be suitable to act as impartial reviewers. Concurrently with the above submission send an e-mail to mrsec@nsf.gov with the above information; include the title of the full proposal, the submitting

organization(s) and the name of the PI(s).

Proposers are reminded to identify the program announcement/solicitation number (04-580) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing at a level of 10 percent of the requested total amount of NSF funds is required for all proposals submitted in response to this announcement/solicitation. The proposed cost sharing must be shown on line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal.

Only items which would be allowable under the applicable cost principles, if charged to the project, may be included in the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in kind (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost sharing toward projects of another Federal agency may not be counted towards meeting the specific cost sharing requirements of the NSF award.

All cost sharing amounts are subject to audit. Failure to provide the level of cost sharing reflected in the approved award budget may result in termination of the NSF award, disallowance of award costs and/or refund of award funds to NSF.

Other Budgetary Limitations:

Awards are expected to range in size from about \$1.0 million/year to a maximum of \$5.0 million/year. The budget for the full proposal may not be larger than the preliminary proposal budget.

C. Due Dates

Proposals must be submitted by the following date(s):

Preliminary Proposals (required):

September 08, 2004

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

January 24, 2005
(by invitation only)

Full Proposals (by invitation only):

January 24, 2005

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII

of this announcement/solicitation.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the [Grant Proposal Guide](#) for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov>

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 ([NSB 97-72](#)). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued [Important Notice 127](#), Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgments.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

In addition to the standard NSF review criteria, reviewers will be asked to use the following criteria. Preliminary proposals will be evaluated in terms of their potential to meet the criteria for full proposals. Achievements under prior NSF support will be critically assessed when re-competing proposals are evaluated.

MRSEC proposals will be evaluated in terms of the interdisciplinary research group(s) and of the Center as a whole. Given competing proposals of essentially equal merit, NSF staff will be responsible for ensuring that the overall program reflects an appropriate balance among research topics and among Centers of differing size and complexity.

A. Interdisciplinary Research Groups:

- Intrinsic merit of the research. Overall quality of the proposed research, and likelihood that the research will lead to fundamental advances, new discoveries, and/or technological developments.
- Competence to perform the research. Capability of the investigators, technical soundness of the proposed approach, and adequacy of the resources available or proposed, including instrumentation and facilities.
- Interdisciplinarity and degree of interconnection within each IRG. Benefits of a multi-investigator, interdisciplinary approach; cooperation and interdependence of the investigators.

B. The Center as a Whole:

- Organizational setting and rationale for the Center. Relationship to existing and planned organizational programs and capabilities in materials research and education; intellectual breadth of the proposed program; potential for stimulating interdisciplinary interaction and collaboration. Potential for organizational, national and international impact.
- Achievements under prior NSF support, where applicable.
- Potential effect on the infrastructure of science and engineering, particularly in fostering a broadly interdisciplinary, interactive approach to materials research and education, developing effective educational outreach programs, fostering a climate of interaction and effective knowledge transfer between the university and its partners in industry and other sectors (see above), effective use of seed funding, and fostering

increased participation in materials research and education of members of underrepresented groups.

- Plans and potential to develop and maintain active collaboration with industry and other organizations; to stimulate and facilitate knowledge transfer among the organizational participants and between the Center and other organizations and sectors; and to strengthen the links between university-based materials research and its application and implementation. Outreach to other organizations and sectors, including international collaboration and cooperation.
- Plans to establish, operate, and maintain shared experimental facilities and to provide appropriate access to users from the home organization, other academic organizations, industry, and other sectors.
- Organizational commitments and other support, management plan, and budget. Organizational and other commitments to the Center. Likely effectiveness of the proposed management plan, including mechanisms for selection of topics and internal allocation of resources, plans for self-evaluation, and plans and potential for maintaining a flexible and innovative program. Appropriateness of the requested budget.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc Review followed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

Special Award Conditions:

See reporting requirements below. Other conditions will be within the cooperative agreement.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Annual progress report and continuation request.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project reporting system, available through FastLane, for preparation and submission of annual and final project reports. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Maija M. Kukla, Program Director, Directorate for Mathematical & Physical Sciences, Division of Materials Research, 1065 N, telephone: (703) 292-4940, fax: (703) 292-9035, email: mkukla@nsf.gov
- Thomas P. Rieker, Program Director, Directorate for Mathematical & Physical Sciences, Division of Materials Research, 1065 S, telephone: (703) 292-4914, email: trieker@nsf.gov

- Ulrich Strom, Program Director, Directorate for Mathematical & Physical Sciences, Division of Materials Research, 1065 N, telephone: (703) 292-4938, email: ustrom@nsf.gov

Information about MRSECs, including current awards, can be found on the NSF Web site at <http://www.nsf.gov/mps/dmr/mrsec.htm>.

For questions related to the use of FastLane, contact:

- Maxine E. Jefferson-Brown, Computer Specialist, Directorate for Mathematical & Physical Sciences, Division of Materials Research, 1065 N, telephone: (703) 292-4918, fax: (703) 292-9035, email: mjeffers@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF [E-Bulletin](#), which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's [Custom News Service](#) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

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The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center): (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**
 - Send an e-mail to: pubs@nsf.gov
 - or telephone: (703) 292-7827

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

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